



*Photo of Musgum mud hut (Tolek) repair, Cameroon.
Source: Vernacular Architecture Archive / Wikimedia Commons.*

Exploring how vernacular building knowledge can inform contemporary sustainable construction through the study of geometry, materials, structural systems and fabrication techniques.

EARTH



Mosque of Djéneé / Mali

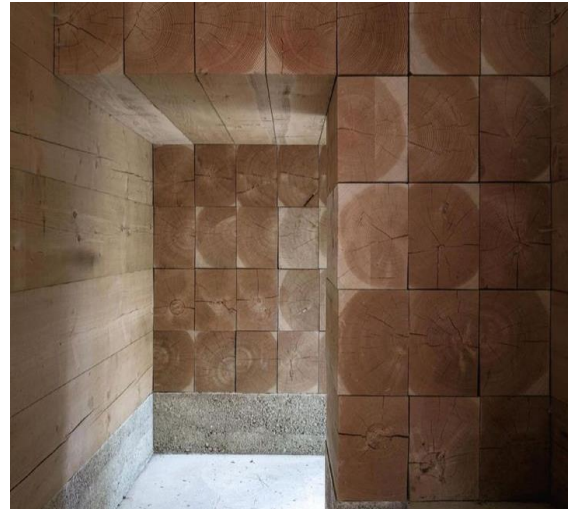


Earth house / Martin Rauch, Austria

TIMBER

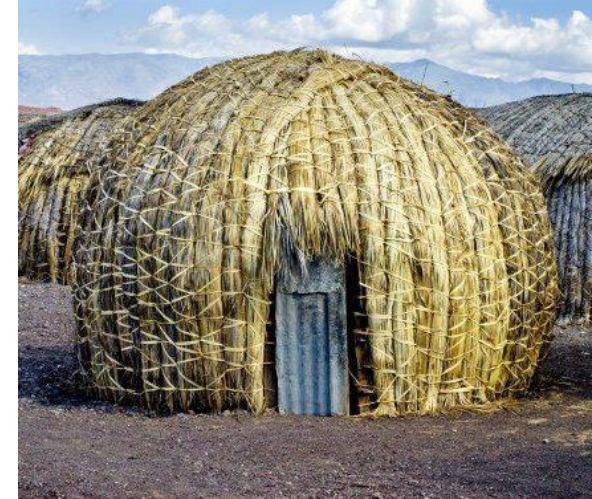


Stabbur / Norway

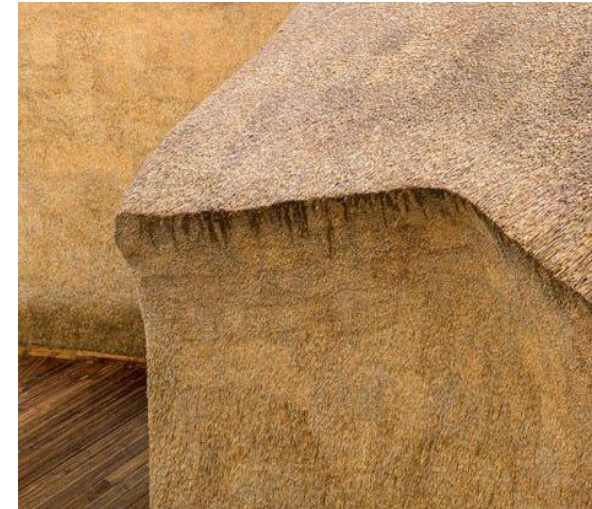


Wooden chapel / John Pawson, Germany

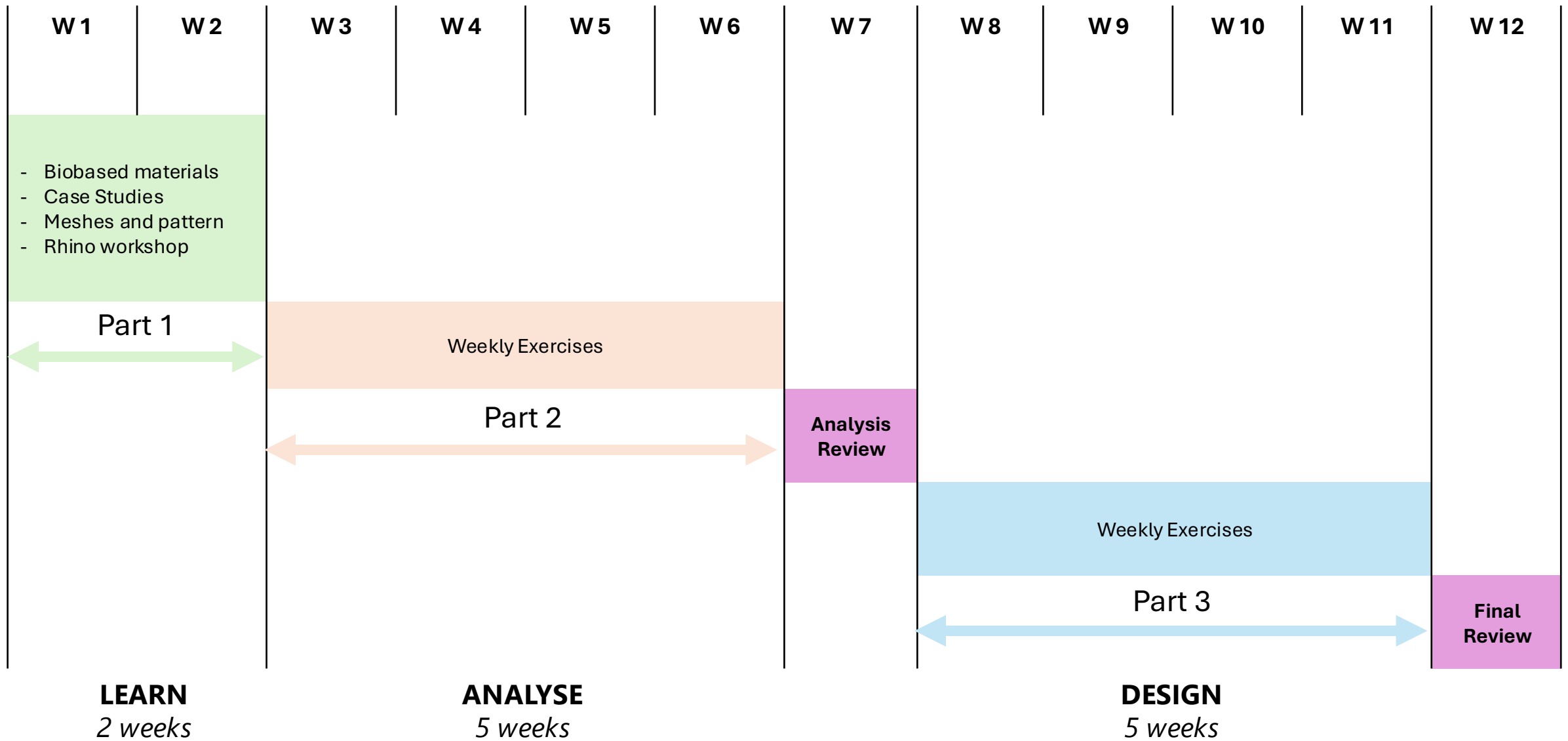
GRASS



Turkana hut / Kenya



Tatched Museum / Guinée*Potin, France



- **Bio-based Materials** - Introduction to material categories and their characteristics
- **Six Case Studies** - Selected examples of the implementation of bio-based materials
- **Meshes and Patterns** – Their role in architecture, civil engineering and computer graphics
- **Rhino Workshop** - Introduction to modelling wireframe structures, patterns and meshes

SIX CONSTRUCTION SYSTEMS - SIX STARTING POINTS



Musgum dwelling / Cameroun



Omo Sebua / Indonesia



Mudhif / Iraq



Esfahk Mud Center / Iran



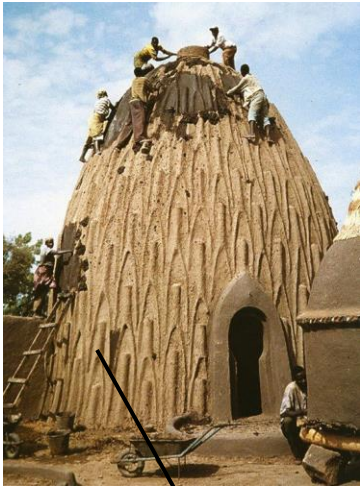
Maison double à deux foyers / Switzerland



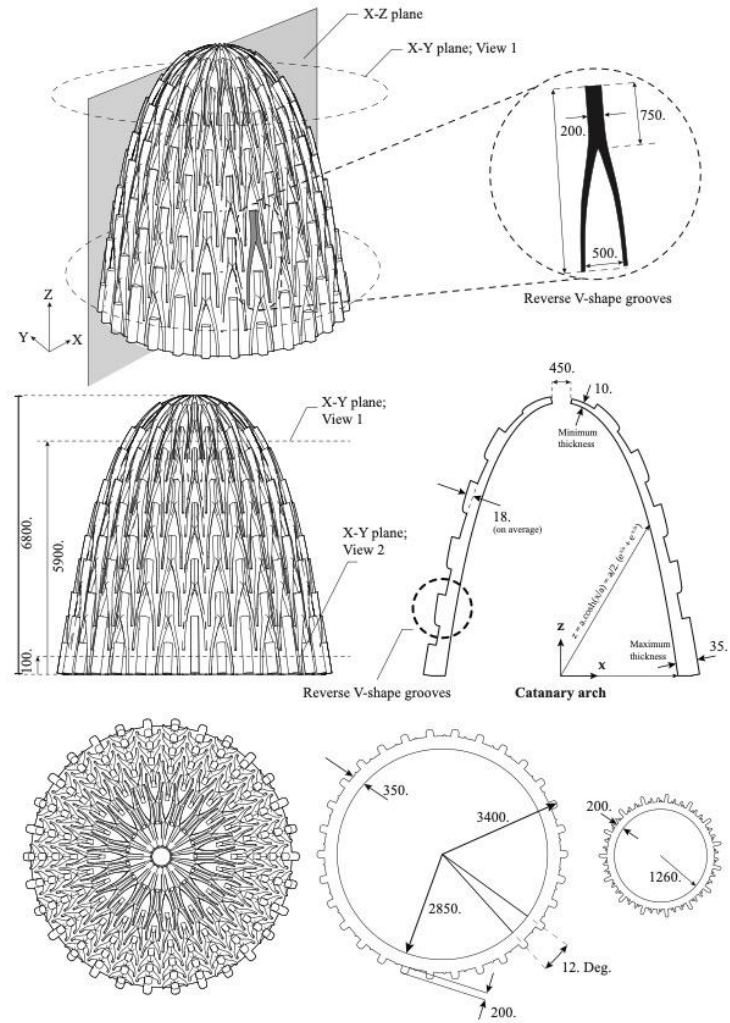
King's Palace / Rwanda

- W3 **Identify** *Principles & Patterns* (Overall geometry, etc.)
- W4 **Model** *Geometry & Meshes* (3D model, components, mesh model)
- W5 **Detail** *Drawings* (main nodes, scaled construction drawings, structural characterization)
- W6 **Analyse** *Structure & Assembly* Sequence (structural behaviour, necessary assembly steps)
- W7 **Synthesyse** *Report & Presentation* – (20-minute oral presentation)

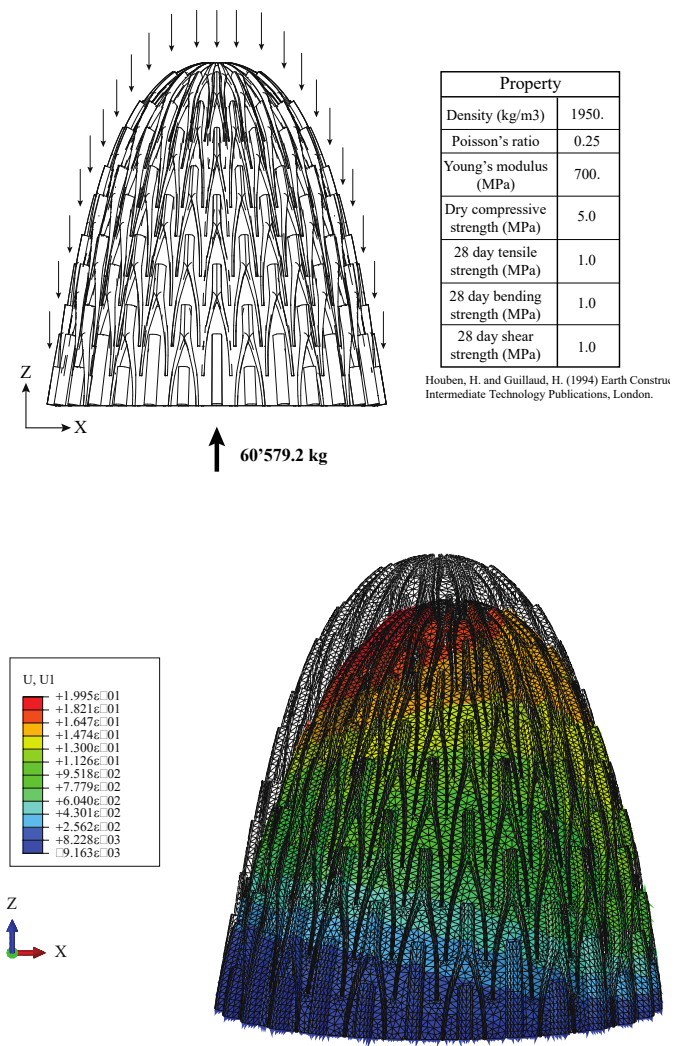
Example: Musgum dwelling



IDENTIFY



MODEL



ANALYSE

Inspired by the case study, you will design a contemporary bio-based structural envelope

according to the following key criteria:

- *Respect the overall **geometric principles** of the case study, including its **form and proportions***
- *Use exclusively **bio-based materials***
- *Integrate **structural capacity** into the envelope (self-supporting or load-bearing)*
- *Ensure **watertightness and airtightness**, and incorporate **thermal insulation***
- *Establish a coherent and adequately **braced structural system***
- *Derive architectural expression from the characteristics of the materials and their specific construction methods*



MATERIALS

Understand how materials drive structure.

COMPUTATION

Develop geometry through Rhino/Grasshopper.

STRUCTURE

Connect architectural and engineering thinking.

DESIGN

Turn analysis into a contemporary envelope.

PATTERNS FOR BIO-BASED MATERIAL ENVELOPES — Spring 2027

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Course starts: [February 2027] IBOIS: GC H2 692

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